WHAT IS CLAIMED IS:

1. An improvement in hydrocarbon synthesis processes using synthesis gas stream containing H_2 and CO, the improvement comprising:

(a) generating a synthesis gas stream in a pressure swing reformer whereby the synthesis gas stream contains greater than a 2:1 mole ratio of H_2:CO; and

(b) separating a portion of the hydrogen from the synthesis gas stream to provide a synthesis gas stream containing about a 2:1 mole ratio of H_2:CO;

(c) introducing the synthesis gas stream of step (b) into a hydrocarbon synthesis reactor for conversion to liquid products therein.

2. The improvement of claim 1 including introducing at least part of the separated hydrogen into the pressure swing reactor as a fuel source.

3. The improvement of claim 2 including cooling the hydrocarbon synthesis reactor with water to produce steam.

4. The improvement of claim 3 including introducing the steam into the pressure swing reformer for reforming hydrocarbons therein.

5. The improvement of claim 3 wherein a portion of the steam is used to power a compressor for compressing another portion of the steam to provide steam at a higher pressure than in the absence of compression.

6. The improvement of claim 1 including recovering unreacted synthesis gas and by products from the hydrocarbon synthesis reactor and recycling the recovered gas and by products to the pressure swing reformer.

7. The improvement of claim 1 wherein the pressure swing reformer is regenerated using a fuel and compressed air provided from a gas turbine.

8. A synthesis gas and hydrocarbon conversion process comprising:

(a) introducing a feed stream comprising a hydrocarbon and steam through a first end of a first zone containing bed packing materials and a steam reforming catalyst to produce a product synthesis gas stream at a first pressure having a ratio of H_2:CO greater than 2:1;

(b) passing at least a portion of the product to step (a) to a second zone containing bed packing materials, and transferring the sensible heat from the product to the packing materials;

(c) removing substantially all of the product from said second zone;

(d) introducing an oxygen-containing gas into the second end of said second zone;

(e) contacting said oxygen-containing gas with a fuel and combusting said gas and fuel within said zones at a second pressure lower than the first pressure, thereby re-heating said first zone to reforming temperatures and creating a fluegas which exits through the first end of said first zone;

(f) separating sufficient hydrogen from the product recovered in step (c) to produce a synthesis gas stream having a H_2:CO ratio of about 2:1; and

(g) introducing the synthesis gas of step (f) into a hydrocarbon synthesis reactor for conversion therein to liquid products.

9. The process of claim 8 including using separated hydrogen step (f) as fuel in step (c).

10. The process of claim 8 including recovering unreacted synthesis gas and by products from the hydrocarbon synthesis reactor and recycling them in step (a).

11. The process of claim 8 wherein the oxygen containing gas of step (d) is compressed air provided by a gas turbine.

12. The process of claim 11 wherein the fluegas of step (e) is delivered to the gas turbine.

13. The process of claim 8 including cooling the hydrocarbon synthesis reactor with water to produce steam and introducing the steam in step (a).

14. The process of claim 13 wherein a portion of the steam is used to power a compressor for compressing another portion of the steam to provide steam at a higher pressure for introduction into step (a).

15. The process of claim 8 including heat exchanging the oxygen containing gas of step (d) with the flue gas of step (e) before introducing the oxygen containing gas into the first end of said second zone.